OIPE IAP34
DEC 06 2005
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

C of C

In re Application of: Eugene B. LEVICH et al.

Patent No.: 6,960,426 B2

Patent Date: November 1, 2005

For: SILVER HALIDE MATERIAL FOR OPTICAL MEMORY DEVICES WITH LUMINESCENT READING AND METHODS FOR THE TREATMENT THEREOF

Confirmation No.: 8265

Application No.: 09/886,979

Filing Date: January15, 2002

Attorney Docket No.: 85134-4999

REQUEST FOR CERTIFICATE OF CORRECTION UNDER 37 C.F.R. §§ 1.322 and 1.323

Certificate
DEC 08 2005
of Correction

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Patentees hereby respectfully request the issuance of a Certificate of Correction in connection with the above-identified patent. The corrections are listed on the attached Form PTO-1050. The corrections requested are as follows:

Column 16:

Line 41 (claim 4, line 6), change "$[FeCN)_{6]}^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --. Support for this change appears in application claim 75.

Line 57 (claim 5, line 12), change "K3[Fe(CN)6], $(NH4)_2S_2O_8$" to -- $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$ --. Support for this change appears in application claim 5.

Line 61 (claim 5, line 16), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --. This change is requested merely to correct a typographical error.

Column 17:

Line 67 (claim 13, line 6), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --. This change is requested merely to correct a typographical error.

12/07/2005 MBIZUNES 00000085 501814 6960426
01 FC:1811 100.00 DA

DEC 09 2005

Column 18:

Line 43 (claim 17, line 4), change "canied" to -- carried --. Support for this change appears in application claim 73.

Line 45 (claim 17, line 6), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --. This change is requested merely to correct a typographical error.

Column 20:

Line 6 (claim 21, line 6), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --. This change is requested merely to correct a typographical error.

The requested changes are to correct errors of a clerical or typographical nature and do not involve changes that would constitute new matter or require reexamination.

A fee of $100 is believed to be due for this request. Please charge the required fees to Winston & Strawn LLP Deposit Account No. 50-1814. Please issue a Certificate of Correction in due course.

Respectfully submitted,

12/6/05
Date

Allan A. Fanucci
Allan A. Fanucci, Reg. No. 30,256

WINSTON & STRAWN LLP
Customer No. 28765

212-294-3311

DEC 09 2005

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.: 6,960,426 B2
DATED: November 1, 2005
INVENTORS: Levich et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 16:
Line 41 (claim 4, line 6), change "$[FeCN)_{6]}^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --.
Line 57 (claim 5, line 12), change "K3[Fe(CN)6], $(NH4)_2S_2O_8$" to -- $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$ --.
Line 61 (claim 5, line 16), change "$[FeCN)_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --.

Column 17:
Line 67 (claim 13, line 6), change "$[FeCN)_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --.

Column 18:
Line 43 (claim 17, line 4), change "canied" to -- carried --.
Line 45 (claim 17, line 6), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --.

Column 20:
Line 6 (claim 21, line 6), change "$[FeCN_6]^{-3}$" to -- $[Fe(CN)_6]^{-3}$ --.

WINSTON & STRAWN LLP
Patent Department
1700 K Street, N.W.
Washington, D.C. 20006-3817

DEC 09 2005

1,1,1',1',3,3'-hexamethylindocarbocyanineiodide was adsorbed from a 1.0×10^{-5}M water alcohol (1:1) solution on formed silver salt of 2-mercaptobenzothyazole. The places where there are particles with adsorbed salt do not luminesce and there was luminescence from the bulk polymer. The dye has an absorption λmax. 650 nm and luminescence λmax. 682 nm.

EXAMPLE 20

The same as in Example 11, except that after bleaching, the layer was treated with 0.1% solution of $Ga(NO_3)_3$ washed with water and treated with 0.05% solution of 8-oxiquinoline. The dye was adsorbed on the insoluble salts that were located at the places were the photolayer was exposed to light. The adsorbed dye was luminescing in the yellow-green range of spectrum.

EXAMPLE 21

The same as in the Example 20, except that after bleaching, the exposed photolayer was treated with 0.1% solution of $Cu(NO_3)_3$ washed with water and treated with 0.2% water solution of methylcalcein. In the places where the photolayer was exposed to light and the copper salt had absorbed the dye had a yellow-green luminescence and the background was not luminescent.

EXAMPLE 22

Similarly to the Example 1, the AgBr emulsion was prepared and was divided into three parts. The first part of the emulsion was spectrally sensitized as in Example 4, the second part of the emulsion was spectrally sensitized as in Example 7 and the third one, as in Example 8. The sensitized emulsions were coated using a multi-slit filler by layers on to the gelatine coated polyethylene terephthalate base. For the information recording the photomaterial consistently exposed through the mask following the light filters, transmitting light with a wavelenghth of 860 nm, 680 nm and 545 nm. The photolayers were subjected to the photo-chemical treatment as in the Example 18 and with a 0.001% water solution of the sodium salt of $1,1^1$-di-γ-sulfopropyl-$5,5^1$-disulfo-$3,3,3^1,3^1$-tetramethylindodicarbocyaninebetaine. The luminescence maximum of the absorbed dye was 700 nm.

EXAMPLE 23

The same as in the Example 22, except that the treatment of layers was conducted with 0.001% water solution of trisodium salt of 1,1'-di-γ-sulfopropyl 5,5'-disulfo-3,3,3',3'-tetramethyl-n-indotricarbocyaninebetaine. The maximum of luminescence -790 nm.

EXAMPLE 24

The silver halide systems are characterized of high photostability. The irradiation of the film obtained in Example 22, for 200 hours in a cuvett of a Shimadzu spectrofluorimeter at a wavelength of 640 nm used for fluorescent excitability did not lead to any changes in the fluorescent intensity. During similar film irradiation, based on the bis-dianilinochloromethyl-1,3,4-oxadiazole as in the U.S. Pat. No. 3,869,363, a decrease of the fluorescent intensitivity of 2.5 times was observed.

Although certain presently preferred embodiments of the present invention have been specifically described herein, it will be apparent to those skilled in the art to which the invention pertains that variations and modifications of the various embodiments shown and described herein may be made without departing from the spirit and scope of the invention. Accordingly, it is intended that the invention be limited only to the extent required by the appended claims and the applicable rules of law.

What is claimed is:

1. A digital optical memory device comprising:

(a) a digital optical memory medium comprising a plurality of layers of a luminescent material for an optical digital memory device, each of said plurality of layers comprising insoluble microparticles dispersed in a water soluble polymer, said microparticles having a particle size less than 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver; and

(b) a two-laser system for two photon writing data in digital form on said digital optical memory medium.

2. The device of claim 1, wherein the luminescent dye is selected from the group consisting of xanthene dyes, acridine dyes, oxazine dyes, indigo dyes, polycyclic vat dyes, benzanthrones in the form of sulfuric esters of leuco compounds, dyes form both luminescent and non-luminescent complexes with polyvalent metal ions, and cyanine dyes.

3. The device of claim 1 wherein the microcrystals have a size of about 0.02 to 0.08 microns and wherein the water soluble polymer is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, gelatin modified with polyvinyl alcohol, polyvinyl pyrrolidone, polyvinyl sulphate, carboxymethylcellulose, cellulose acetophthalate, phthaloylgelatine or graft polymers of gelatin with polymethoxydiethyleneglycol acrylate, polydiacetoneacrylamide or poly-N,N'-methylenediacrylamide, and mixtures thereof.

4. The device of claim 1, wherein the silver microparticles are oxidized by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^-, CN^-, $Cr_2O_7^{2-}$, WO_4^{2-}, $[FeCN)_6]^{-3}$ oxalate, citrate and anions of 1-phenyl-5-mercaptotetrazole, 2-mercaptobezothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds. $Fe[(CN)_6]^{-3}$

5. A digital optical memory device comprising:

(a) a digital optical memory medium comprising a plurality of layers of a luminescent material for an optical digital memory device, each of said plurality of layers comprising insoluble microparticles dispersed in a water soluble polymer, said microparticles having a particle size less than 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver by an oxidizer selected from the group consisting of K3[Fe(CN)6], $(NH4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^-, CN^-, $Cr_2O_7^{2-}$, WO_4^{2-}, $[FeCN)_6]^{-3}$, oxalate, citrate and anions of 1-phenyl-5-mercaptotetrazole, 2-mercaptobezothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds; and $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $[Fe(CN)_6]^{-3}$

(b) a two-laser system for two photon writing data in digital form on said digital optical memory medium.

6. The memory device of claim 5, wherein the two-laser system comprises means for two-photon writing of the data in a three dimensional optical matrix in said digital optical memory medium.

7. The memory device of claim 5 wherein

at least one of said plurality of layers has data stored in digital form therein; and

the device further comprises means for reading said data in said digital form from said digital optical memory medium.

8. The device of claim 5, wherein the luminescent dye is selected from the group consisting of xanthene dyes, acridine dyes, oxazine dyes, indigo dyes, polycyclic vat dyes, benzanthrones in the form of sulfuric esters of leuco compounds, dyes form both luminescent and non-luminescent complexes with polyvalent metal ions, and cyanine dyes.

9. The device of claim 5 wherein the microcrystals have a size of about 0.02 to 0.08 microns and wherein the water soluble polymer is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, gelatin modified with polyvinyl alcohol, polyvinyl pyrrolidone, polyvinyl sulphate, carboxymethylcellulose, cellulose acetophthalate, phthaloylgelatine or graft polymers of gelatin with polymethoxydiethyleneglycol acrylate, polydiacetoneacrylamide or poly-N,N'-methylenediacrylamide, and mixtures thereof.

10. A method of reading digital data comprising:

(a) providing a digital optical memory medium, the medium comprising a plurality of layers of a luminescent material for an optical digital memory device, each of said plurality of layers comprising insoluble microparticles dispersed in a water soluble polymer, said microparticles having a particle size less than 0.2 microns, said microparticles having a sorbed luminescent dye, said insoluble microparticles comprising silver microparticles and insoluble metal salts, said silver microparticles being a product of oxidation of silver, at least one of said plurality of layers having data stored in digital form therein from a two-laser system for two photon writing of such data in digital form on said digital optical memory medium; and

(b) reading said data in said digital form from said digital optical memory medium.

11. The method of claim 10, wherein the luminescent dye is selected from the group consisting of xanthene dyes, acridine dyes, oxazine dyes, indigo dyes, polycyclic vat dyes, benzanthrones in the form of sulfuric esters of leuco compounds, dyes form both luminescent and non-luminescent complexes with polyvalent metal ions, and cyanine dyes.

12. The method of claim 10 wherein the microcrystals have a size of about 0.02 to 0.08 microns and wherein the water soluble polymer is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, gelatin modified with polyvinyl alcohol, polyvinyl pyrrolidone, polyvinyl sulphate, carboxymethylcellulose, cellulose acetophthalate, phthaloylgelatine or graft polymers of gelatin with polymethoxydiethyleneglycol acrylate, polydiacetoneacrylamide or poly-N,N'-methylenediacrylamide, and mixtures thereof.

13. The method of claim 10, wherein the silver microparticles are oxidized by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^-, CN^-, $Cr_2O_7^{2-}$, WO_4^{2-}-$[FeCN)_6]^{-3}$, oxalate, citrate

$[Fe(CN)_6]^{-3}$

and anions of 1-phenyl-5-mercaptotetrazole, 2-mercaptobezothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds.

14. A method of storing information on a digital optical memory medium, the method comprising:

forming a digital optical memory medium by:

simultaneously extruding, from a multi-slit filler, thin layers of photographic emulsion and between them thick layers of silver halide free polymer to a substrate to form a multi-layer material;

exposing said multi-layer material to light;

developing and fixation of said multi-layer material to form silver particles from the exposed silver halide;

oxidation of the silver particles to form the insoluble salt particles;

treating the multi-layer material with luminescing dye and allowing the luminescing dye to be sorbed onto the particles; and

writing data in digital form onto said medium a two-laser system for two photon writing of such data in digital form on said digital optical memory medium.

15. The method of claim 14, wherein the luminescent dye is selected from the group consisting of xanthene dyes, acridine dyes, oxazine dyes, indigo dyes, polycyclic vat dyes, benzanthrones in the form of sulfuric esters of leuco compounds, dyes form both luminescent and non-luminescent complexes with polyvalent metal ions, and cyanine dyes.

16. The method of claim 14 wherein the microcrystals have a size of about 0.02 to 0.08 microns and wherein the water soluble polymer is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, gelatin modified with polyvinyl alcohol, polyvinyl pyrrolidone, polyvinyl sulphate, carboxymethylcellulose, cellulose acetophthalate, phthaloylgelatine or graft polymers of gelatin with polymethoxydiethyleneglycol acrylate, polydiacetoneacrylamide or poly-N,N'-methylenediacrylamide and mixtures thereof.

17. The method of claim 14, wherein the silver microparticles are oxidized by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being canied out in a presence of anions selected from the group consisting of SCN^-, CN^-, $Cr_2O_7^{2-}$, WO_4^{2-}-$[FeCN)_6]^{-3}$, oxalate, citrate and anions of 1-phenyl-5-mercaptotetrazole, 2-mercaptobezothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds.

carried

$[Fe(CN)_6]^{-3}$

18. A method of digitally storing information, the method comprising:

providing one or a plurality of layers comprising silver halide particles having a particle size less than about 0.2 microns;

exposing at least one layer to light using two laser beams at at least one predetermined point of the layer(s);

developing and fixation of said exposed layer(s) to form silver particles from the exposed silver halide;

oxidizing the silver particles to form insoluble salt particles; and

treating the layer(s) with luminescing dye and allowing the luminescing dye to be sorbed onto the particles.

19. The method of claim 18, wherein the luminescent dye is selected from the group consisting of xanthene dyes, acridine dyes, oxazine dyes, indigo dyes, polycyclic vat dyes, benzanthrones in the form of sulfuric esters of leuco

compounds, dyes form both luminescent and non-luminescent complexes with polyvalent metal ions, and cyanine dyes.

20. The method of claim **18** wherein the microcrystals have a size of about 0.02 to 0.08 microns and wherein the water soluble polymer is selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, gelatin, gelatin modified with polyvinyl alcohol, polyvinyl pyrrolidone, polyvinyl sulphate, carboxymethylcellulose, cellulose acetophthalate, phthaloylgelatine or graft polymers of gelatin with polymethoxydiethyleneglycol acrylate, polydiacetoneacrylamide or poly-N,N'-methylenediacrylamide, and mixtures thereof.

21. The method of claim **18**, wherein the silver microparticles are oxidized by an oxidizer selected from the group consisting of $K_3[Fe(CN)_6]$, $(NH_4)_2S_2O_8$, $KMnO_4$, $CuCl_2$, $FeCl_3$ and quinones, and said oxidation being carried out in a presence of anions selected from the group consisting of SCN^-, CN^-, $Cr_2O_7^{2-}$, WO_4^{2-}-$([FeCN)_6]^{-3}$, oxalate, citrate and anions of 1-phenyl-5-mercaptotetrazole, 2-mercaptobezothiazole, 2-mercaptobenzoxazole, 2-mercaptobenzimidazole and organic mercapto compounds. $[Fe(CN)_6]^{-3}$

* * * * *